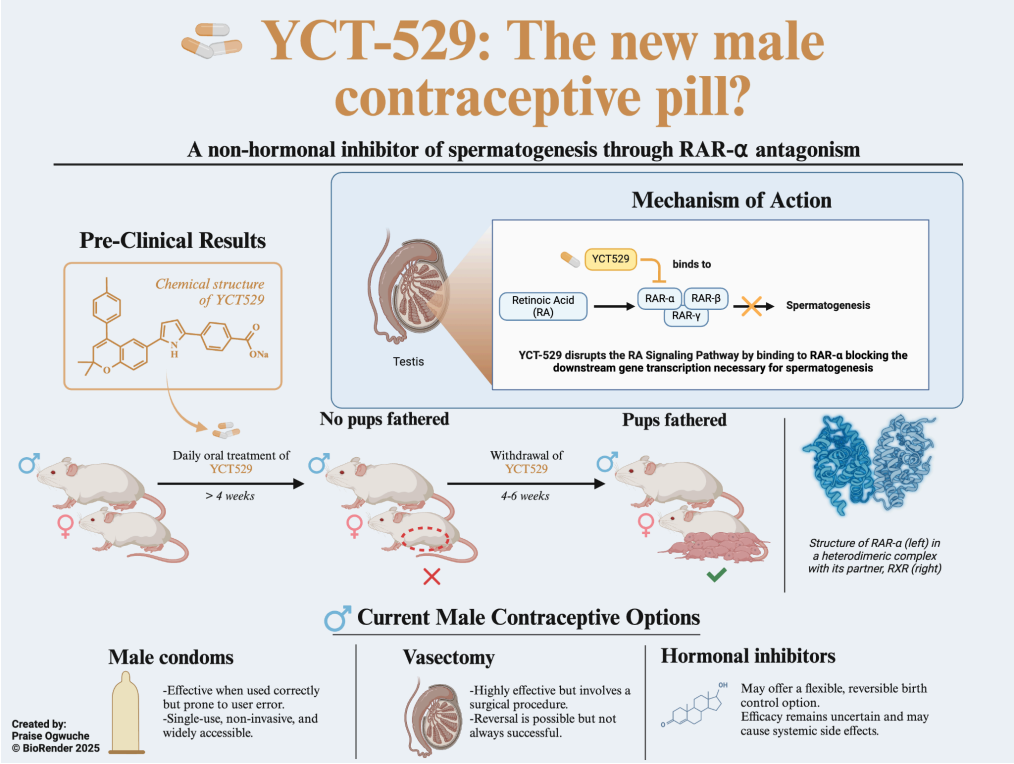
Executive Summary - YCT-529: A Potential Male Contraceptive Pill

Male contraception remains limited, with no widely available oral options. YCT-529, a non-hormonal RAR-α inhibitor, shows promise in disrupting spermatogenesis. My Capstone explores its potential through:

Part 1: Literature Review

YCT-529 blocks RA signaling, leading to reversible infertility in male mice. After **4+ weeks** of treatment, no pups were fathered, but fertility returned **4-6 weeks post-withdrawal**. Unlike hormonal methods, YCT-529 avoids systemic side effects.



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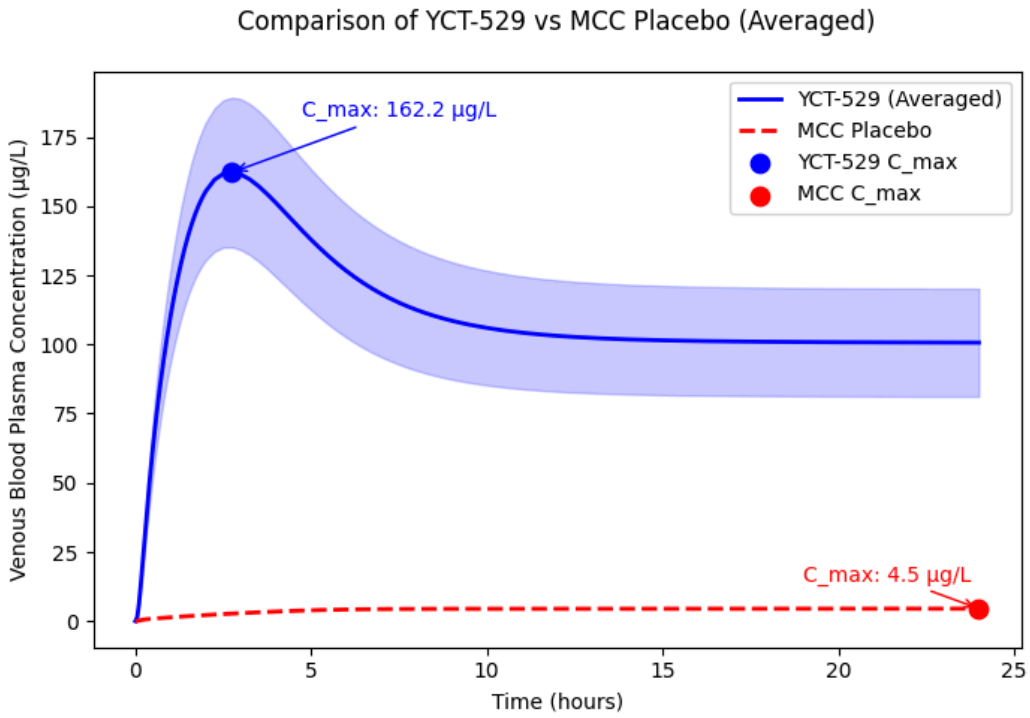
Part 2: Pharmacokinetic Modeling

To understand YCT-529's pharmacokinetics, I simulated its absorption, metabolism, and elimination in **16,000 virtual participants** using **PK-Sim and ADMETLab**. My study focused on:

- **Dosing:** Systemic exposure increased with dose, reaching **500 µg/L at 180 mg**.
- **Population Differences:** East Asians exhibited the highest plasma retention, likely due to CYP3A4 metabolism, while Black Americans had the lowest.
- **Validation:** Atazanavir, a reference drug, closely matched clinical data, confirming the model's reliability.
- **Dietary Impact:** While food reduced peak absorption (C\textsubscript{max}), plasma levels stabilized beyond **10 hours**, suggesting minimal long-term effects.
- **Clinical Relevance:** The model helps refine dosing strategies and predicts variability in drug response across populations.



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YCT-529 shows potential as a male contraceptive, but clinical trials are needed to confirm efficacy and assess dietary effects on absorption. My work provides a foundation for future research.